



*Better Buildings Residential Network  
Peer Exchange Call Series*

*What's Working in Local Residential Efficiency Policies?*

*July 14, 2022*

# Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers
  - **Hannah Bastian**, American Council for an Energy-Efficient Economy (ACEEE)
  - **Andy Meyer**, Efficiency Maine
  - **Carolyn Elam**, City of Boulder
- Open Discussion
- Closing Poll and Announcements

## Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

*The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.*

## Join the Network

### Member Benefits:

- Recognition in media, social media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

### Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

### Upcoming Calls (2<sup>nd</sup> & 4<sup>th</sup> Thursdays):

- 7/28: *Understanding Clean Heat Standards – What Is the Lay of the Land?*
- 8/11: *What Are Best Practices in Behavior Change for Energy Efficiency and Carbon Reduction*

Peer Exchange Call summaries are posted on the Better Buildings [website](#) a few weeks after the call

For more information or to join, for no cost, email [bbresidentialnetwork@ee.doe.gov](mailto:bbresidentialnetwork@ee.doe.gov), or go to [energy.gov/eere/bbrn](https://energy.gov/eere/bbrn) & click Join



**Hannah Bastian**  
*American Council for an Energy-Efficient Economy*



The **American Council for an Energy-Efficient Economy** (ACEEE), a nonprofit research organization, develops policies to reduce energy waste and combat climate change. Its independent analysis advances investments, programs, and behaviors that use energy more effectively and help build an equitable clean energy future.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

[aceee.org](http://aceee.org) @ACEEEdc

# Local Residential Efficiency Policies

Hannah Bastian, Senior Research Analyst

# Overview

- Overview of ACEEE Clean Energy Scorecard
- Policies Targeting New Construction
- Policies Targeting Existing Buildings

# ACEEE Clean Energy Scorecard

100 Cities:

Figure 1. Selection of cities

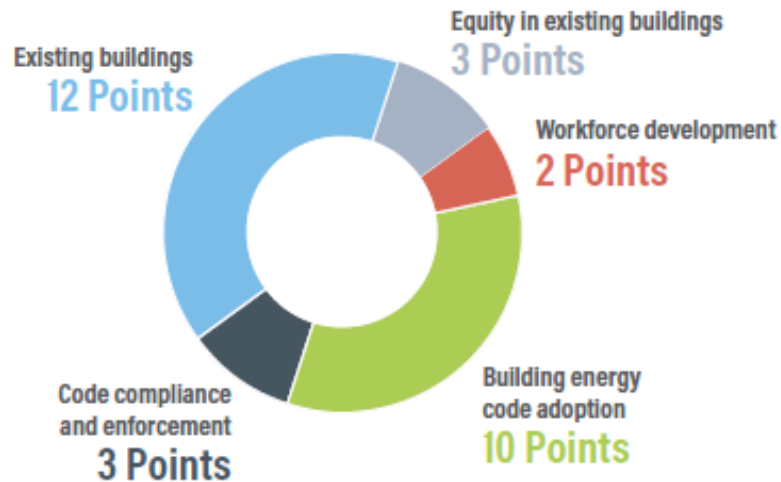


- Community-wide Initiatives
- Buildings Policies
- Transportation Policies
- Energy and Water Utilities
- Local Government Operations



# Buildings Chapter of Scorecard

Figure 21. Buildings policies scoring overview



## 2021 Rankings

1. Denver (26.5/30)
2. New York (24/30)
3. Seattle (23/30)
4. Minneapolis (22/30)
5. San Francisco (21/30)

Median Score: 7.5/30

# Policies Targeting New Construction

# Residential Building Energy Codes



NBI's zEPI Score

## 2021 Results:

1. New York State Code (zEPI 47.0)
2. Massachusetts State Code (48.7)
3. Des Moines Municipal Code (51.2)
4. New Jersey State Code (51.5)
5. Philadelphia Municipal Code (51.8)

# Additional Building Code Policies

| Policy                      | Example Policies   |
|-----------------------------|--|
| Solar Ready                 | California State Code<br>IECC Appendix RB (Ex. Denver, DC)<br>SolSmart Designation |
| EV Ready                    | Single Family (Ex. Boise)<br>Multifamily (Ex. Atlanta, Minneapolis)                |
| EV Requirement              | Single Family (Ex. San Jose)<br>Multifamily (Ex. Boston, Minneapolis)              |
| Low-Energy Use Requirements | Green Building Codes (Ex. Austin, Boston)<br>LEED (Ex. Miami, Portland (Or))       |

# Policies Targeting Existing Buildings

# Building Performance Standards

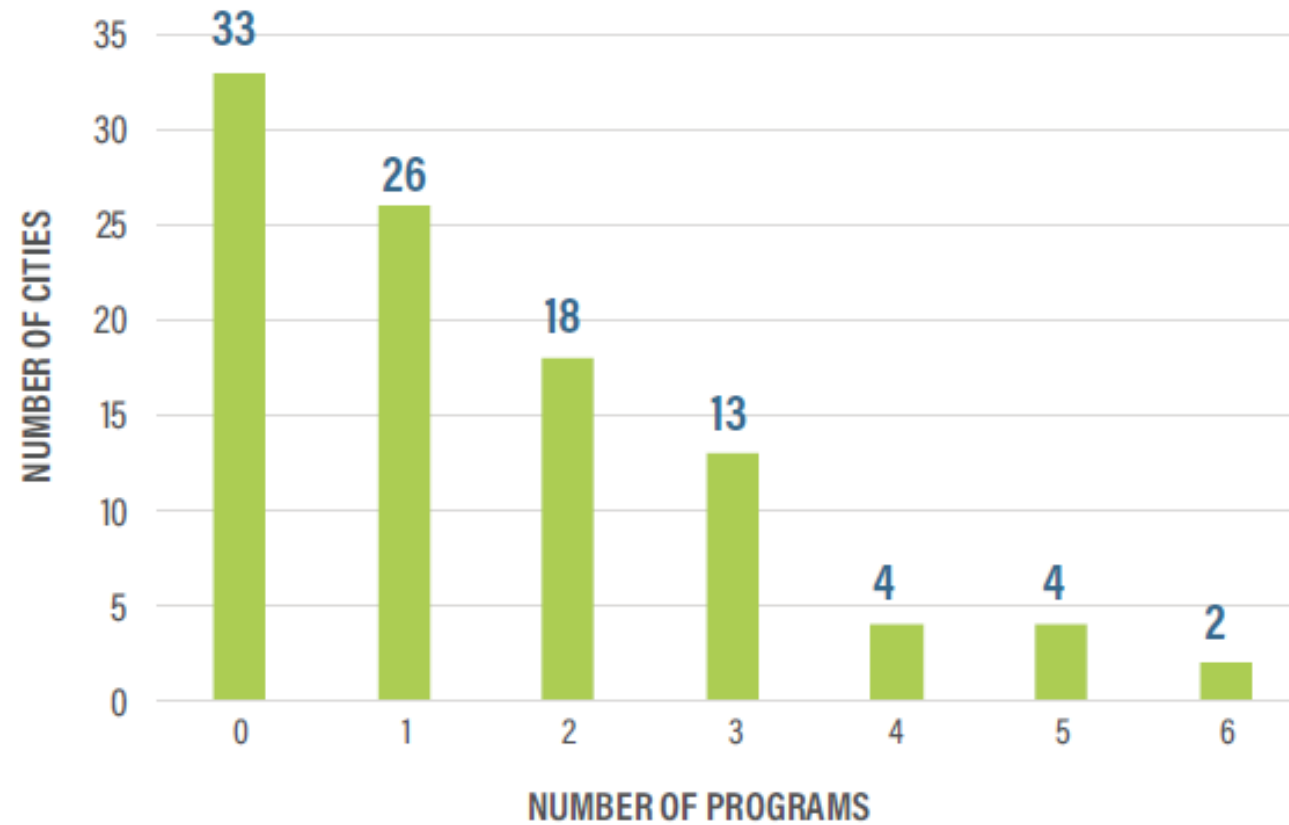
- Set phased energy or emissions reduction requirements for certain buildings
- Multifamily Buildings
- New York Law 97
- Colorado HB 21-1286
- St. Louis Board Bill 219
- DC Clean Energy Act of 2018

# Benchmarking and Energy Transparency

- Multifamily – Annual reporting with a size threshold (>10,000 sq. ft.)
  - 32 of 100 cities had a multifamily benchmarking policy
- Single Family – Time of Sale Requirement
  - Portland, Minneapolis, Austin, Honolulu, Chicago

# Incentive Programs

Figure 22. Cities with energy efficiency and renewable energy incentive programs for residential buildings





# Additional Policies

| Policy                                   | Example Cities             |
|--|----------------------------|
| Retrofit/ Retrocommissioning Requirement | Los Angeles, New York City |
| Cross-Cutting                            | Boston                     |
| Rental Disclosure Policies               | Minneapolis                |
| Energy Audit Requirements                | Austin, Los Angeles        |
| Voluntary Policies                       | Kansas City, Louisville    |



Questions?



**Andy Meyer**  
*Efficiency Maine*



# Efficiency Maine's Residential Heat Pump Program – *Secret Sauce*

Andy Meyer, Senior Program Manager, Efficiency Maine

July 14, 2022

# Efficiency Maine

- Quasi-state agency that runs Maine's energy-efficiency programs
- Helps customers save electricity, natural gas, and other fuels
- Funded by:
  - Electric and natural gas utility ratepayers
  - Regional Greenhouse Gas Initiative
  - ISO New England grid operator (Forward Capacity Market)
  - Federal funds, settlements, and other sources
- Drives energy efficiency by offering rebates, financing, technical information, and a network of independent installers
- Residential program rebated more than 20,000 heat pumps in FY2021 in a state with 570,000 homes

# Residential Heat Pump Program History



**Established 2012**

## **Challenges:**

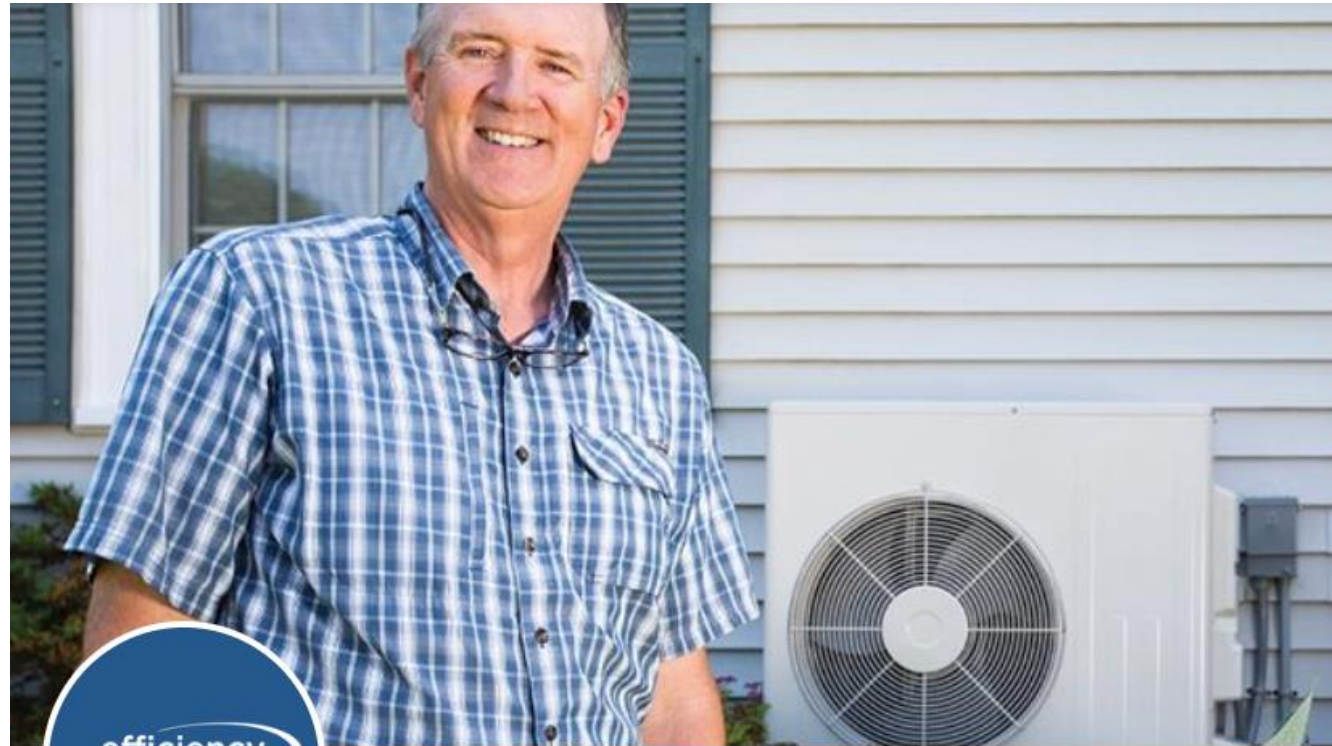
- Lack of awareness about heat pump technology, benefits, and cost savings
- Public misconceptions about modern heat pump technical capabilities in cold climates
- Not enough installers to help drive demand

**Response:** Efficiency Maine offered rebates, financing, technical information, and an online database of independent installers.



# Understanding Market Need

1. Visited, interviewed, and surveyed more than 1,000 homeowners
2. Determined key customer motivators: Low-cost heat/AC, room-by-room control, safety, and air quality
3. Invested in a statewide campaign



**Efficiency Maine**

4.4K followers • 25 following



# Program Design

1. Ductless, mini-split heat pumps
2. Tiered rebates based on efficiency rating
3. Downstream, mail-in rebate, statewide
4. Network of 700 independent installers

## There are four types of indoor units:

1) Wall units



2) Floor units



3) Ceiling cassettes



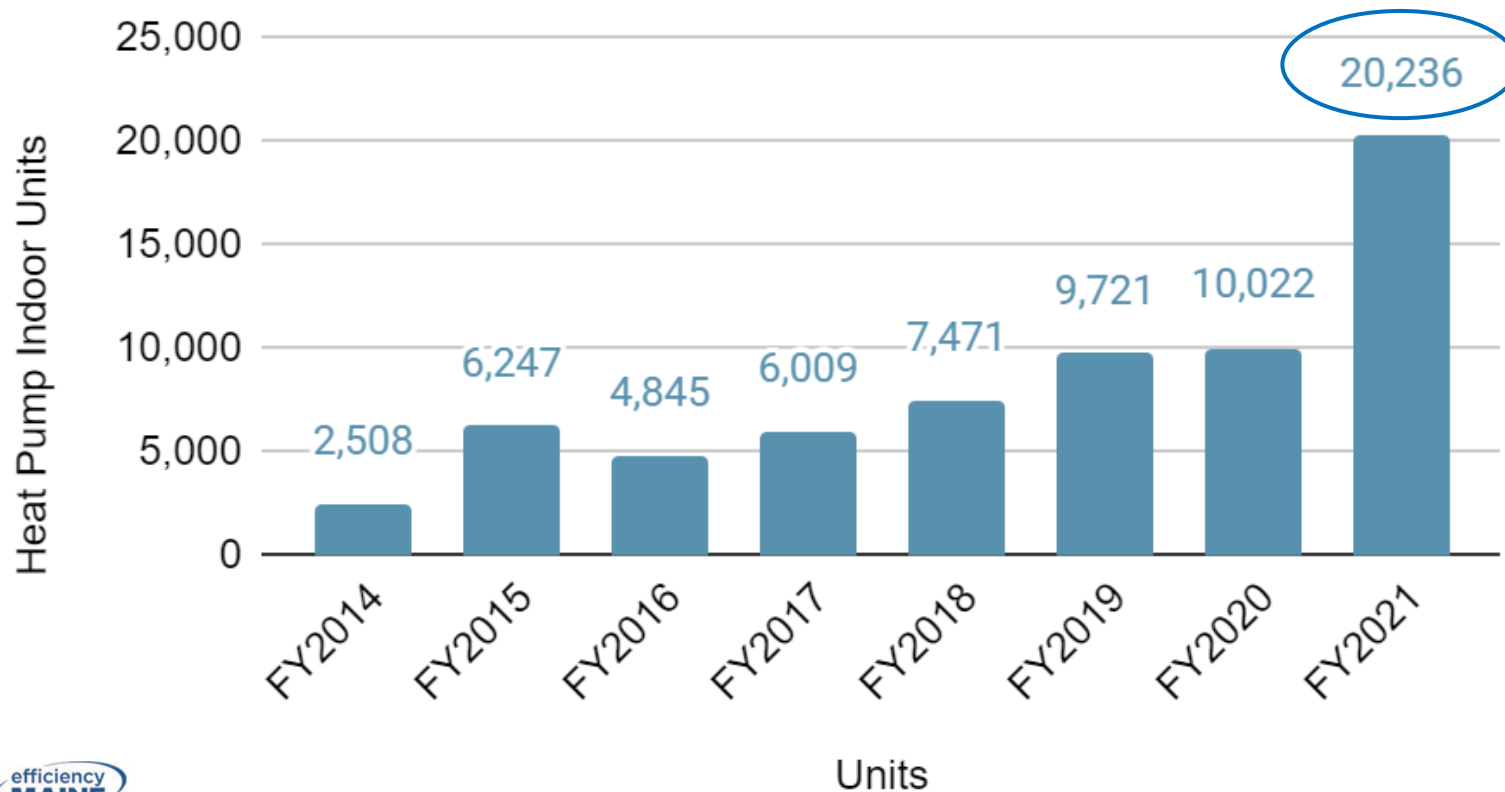
4) Ducted





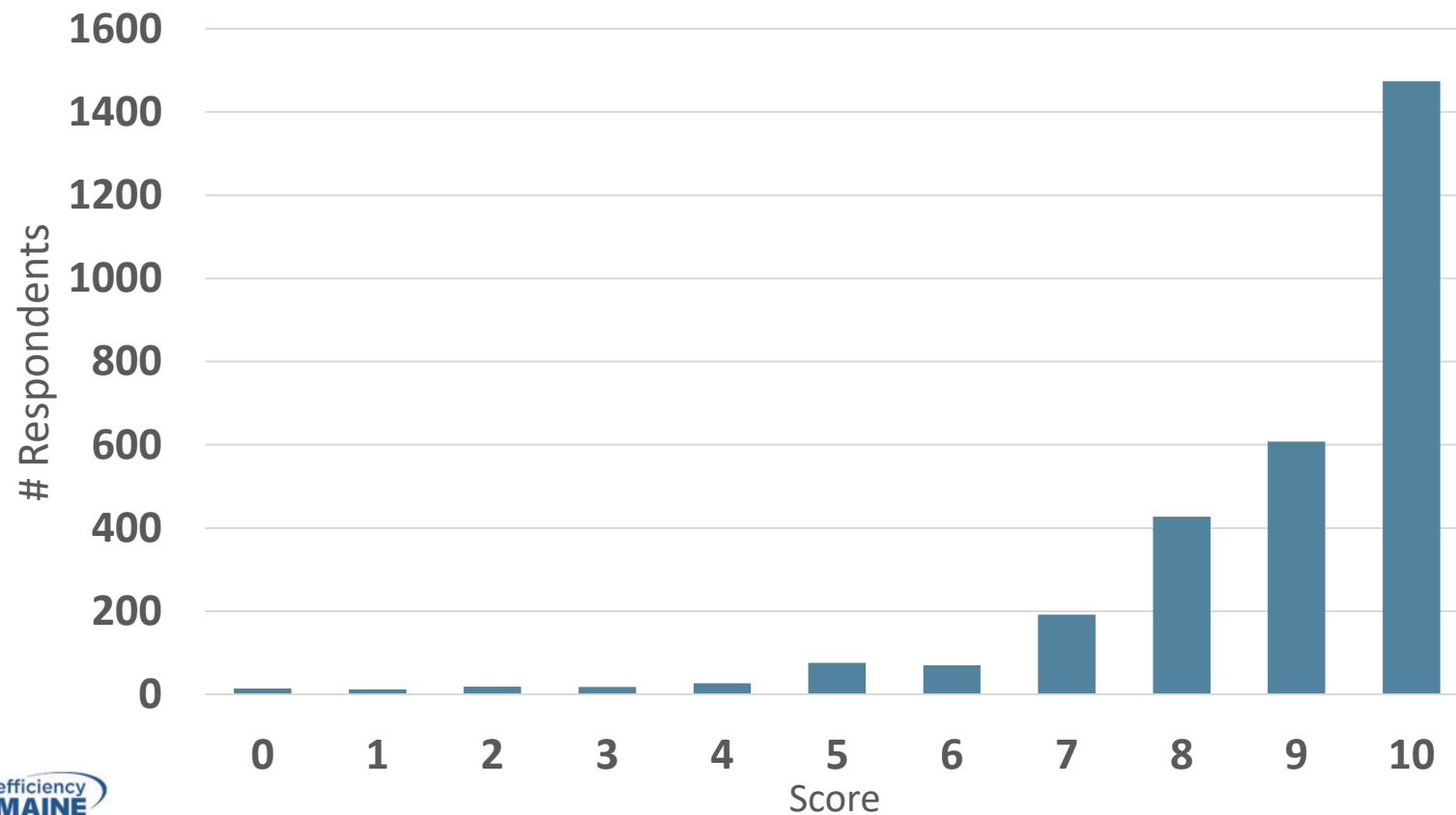
# Results: Scaling up Heat Pump Systems

Heat Pump Indoor Units Rebated



FY21 - Saving customers \$7 million/year in fossil fuels

# Results: Customer Satisfaction



**~ 90%**  
rated their  
experience  
9 or 10 on a  
scale of 0-10

# Critical Success Factors

1. Motivating Incentives
2. Simple
3. Marketed
4. Installer Support
5. Continuously Improved

# 1. Motivating Incentives



**Income-Eligible  
Rebates Up to \$2,400**



**Any-Income Rebates  
Up to \$1,200**

## 2. Simple

1. Heat pump: based solely on efficiency rating, not on a qualified-product list
2. Installation: based on 1-page checklist
3. Installer must have:
  - a) Insurance
  - b) U.S. EPA Section 608
  - c) Manufacturer installation training
  - d) 1-hour heat pump basics training video on website
4. Participant: anyone
5. Building: 1 – 4 unit, residential, 2 indoor units/dwelling, no weatherization prerequisite

## 3. Marketed

### 1. Key customer motivators

- Low-cost heat/AC, room-by-room control, safety, and air quality

### 2. Statewide campaign

- Website, direct mail, email, earned media, events, utility bill stuffers, print, radio, social media, Google Ads, and webinars

### 3. Collaborative marketing

- Installers, non-profits, utilities, municipalities, homeowner associations, etc.

### 4. Online tools

- Home heating cost calculator, installer locator, installation guide, brochures, user tips, videos, etc.

## Residential



### Nancy & Jim Case Study

See how one Presque Isle couple is saving an estimated 50 percent on their heating costs after installing a high-efficiency heat pump.

▶ Watch Now

## 4. Installer Support

### High Impact

- Rebates
- Leads
- Trade ally support team
- Endorsement

### Low Impact

- Free brochures
- Co-op marketing
- Training scholarships
- Newsletters

## 5. Continuously Improved

- Installer “ride-alongs”
- Weekly call recording monitoring
- Review 100% of customer satisfaction surveys
- Review [efficiencymaine.com](http://efficiencymaine.com) webpages
- Installer technician trainings (guest lecturer)
- Attend manufacturer trainings
- Events
- Technical Advisory Group
- Bi-weekly installation inspection video reviews





# Heat Pump Program Lessons Learned

- Heat pumps don't need backup in the cold ("dual fuel")
- Stocking incentives don't make a difference
- Financing has had minimal impact to date
- Demand is not driven by technology-savvy homeowners
- Installers and manufacturers drive workforce development
- It's not necessary to weatherize before installing heat pumps



# Secret Sauce

- Emphasize customer benefits (not technology)
- Focus on inspiring customer action
- Establish and follow program mission and guiding principles
- Seek to serve customers and installers
- Seek and follow top-performers' feedback
- Successful installers need sales skills (not just HVAC)
- Demand drives supply (supply does *not* drive demand)
- Document processes and follow documentation
- List installers sorted by number of rebates paid (not alphabetical)

# List of 700 Installers

What services do you need?

ZIP Code:

Distance:

Sort by:

Heat Pumps x

04401

25 Miles

Number Of EM Rebates\*

SEARCH

| Vendor:   | Energy Assessment & Air Sealing | Insulation | Heat Pumps | Natural Gas/Propane/LP Heating | Oil/Kerosene Heating | Pellet Boilers | Pellet/Wood Stoves | Geothermal | Heat Pump Water Heater | Solar | Phone:       | Web/Email:   |          |
|---|---------------------------------|------------|------------|--------------------------------|----------------------|----------------|--------------------|------------|------------------------|-------|--------------|--|----------|
| 1. <b>Valley Home Services</b><br>2477 Rt 2, Hermon, ME - 04401                         | ●                               |            |            |                                |                      |                |                    |            |                        |       | 800-316-7815 | <a href="#">Visit Website</a><br><a href="#">Send an Email</a> | 0 Miles  |
| 2. <b>MAC Heat Pumps</b><br>87 Hillside Ave, Suite 3, Bangor, ME - 04401                | ●                               |            |            |                                |                      |                |                    |            |                        |       | 207-947-3851 | <a href="#">Visit Website</a><br><a href="#">Send an Email</a> | 0 Miles  |
| 3. <b>Dave's Mechanical Maintenance Inc</b><br>25 Grove St, Milford, ME - 04461         | ●                               | ●          | ●          |                                |                      |                |                    |            |                        |       | 207-951-6274 | <a href="#">Visit Website</a><br><a href="#">Send an Email</a> | 15 Miles |
| 4. <b>New England Heat Pumps</b><br>507 N Main St, Brewer, ME - 04412                   | ●                               |            |            |                                |                      |                |                    |            |                        |       | 207-745-3489 | <a href="#">Visit Website</a><br><a href="#">Send an Email</a> | 7 Miles  |
| 5. <b>Holden Energy and Alternative Technology</b><br>43 Mt View Ln, Holden, ME - 04429 | ●                               |            |            |                                |                      |                |                    |            |                        |       | 207-852-6612 | <a href="#">Visit Website</a><br><a href="#">Send an Email</a> | 14 Miles |

**For more information:  
[efficiencymaine.com](http://efficiencymaine.com)**



**Carolyn Elam**  
*City of Boulder*

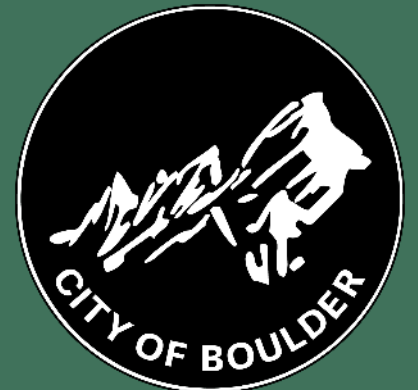
# Residential Efficiency: Boulder's Voluntary and Regulatory Strategies

Carolyn Elam

Sustainability Senior Manager

Department of Climate Initiatives

City of Boulder



# Local Context - Boulder

Population: 110,000

Home to CU Boulder, a thriving science and tech industry

Strong outdoor recreation and tourism industry

Median Home Price: >\$700,000 (>\$1M for single family detached)

In-commuters: ~60,000

Highest Flood Risk in State

2 degrees hotter than historical averages and continuing to rise

High fire risk and extended fire season

Reclassified as severe non-attainment for ozone







**2030**

**Emissions ↓ 70%**

**100% Renewable Electricity**

**100 MW Local Renewable  
Generation**



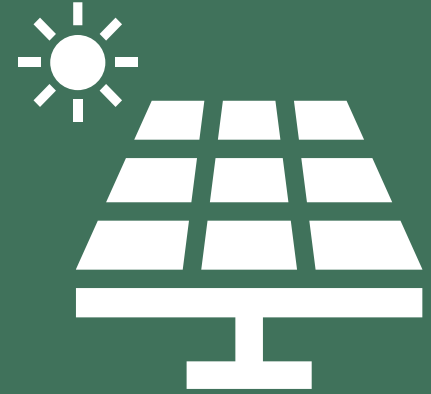
**2035**

**Net Zero**



**2040**

**Carbon-Positive**



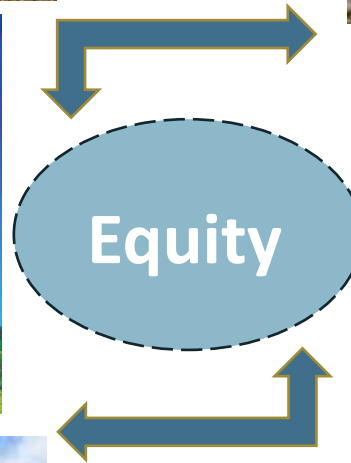
**2050**

**175 MW Local  
Renewable  
Generation**



# Expanding the Scope of Climate Action

## Climate Stabilization

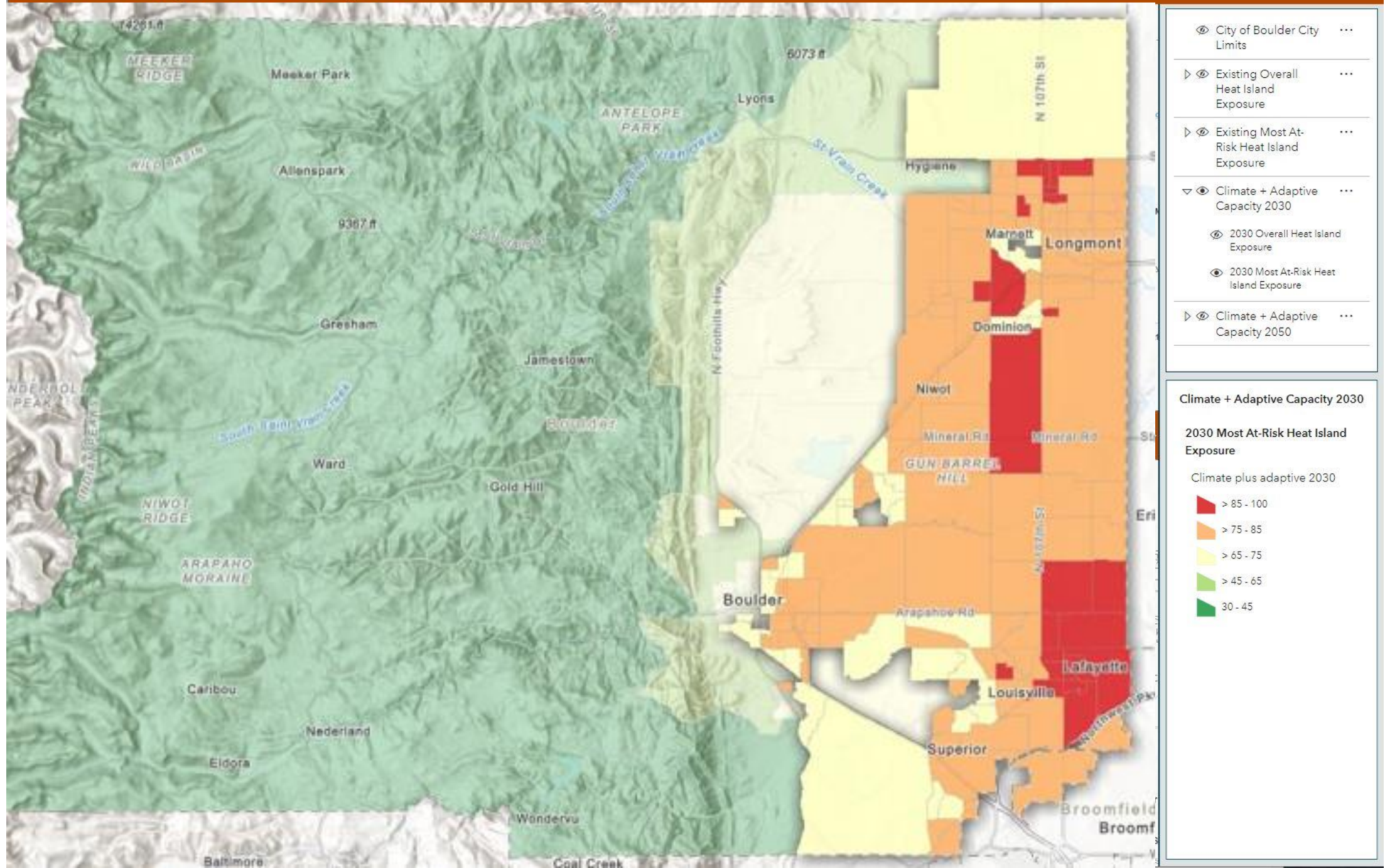


## Climate Change Resilience





# Boulder County Heat Island Exposure



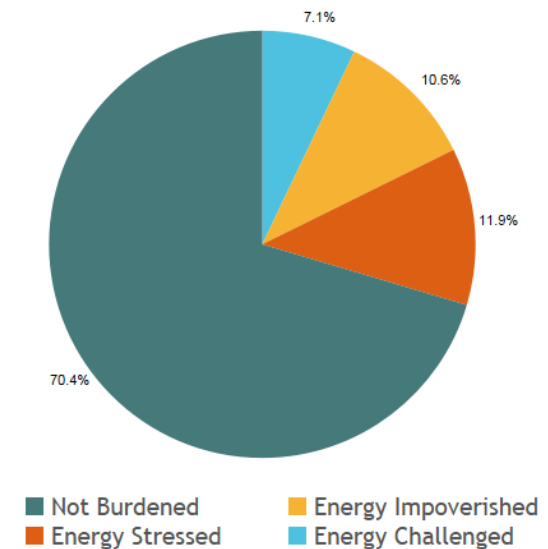
# Energy Burden: A Climate and Energy Risk

While the average household spends about 2% of their income on energy, 30% of Colorado households spend much more and are classified as energy burdened

More than 10% of Coloradans are considered energy impoverished (>10% of incomes is spent on energy costs)

Several hundred Boulder households spend at least 14% of their incomes on their energy needs.

Energy-Burdened Households in Colorado



Census.gov American Community Survey

*Historical figures that do not yet reflect the realities of extreme heat and poor air quality.*

# Buildings: Healthy, Efficient and Resilient

Our approximately 44,000 residential units and 3700 commercial buildings represent more than two-thirds of our community's emissions

Once built, buildings last 50+ years; modifying something already built is challenging and costly

The average person spends 90% of their time indoors; this figure will continue to increase with rising temperatures and declining air quality

More than half of Boulder's residential units are rentals



# Policy and Regulation

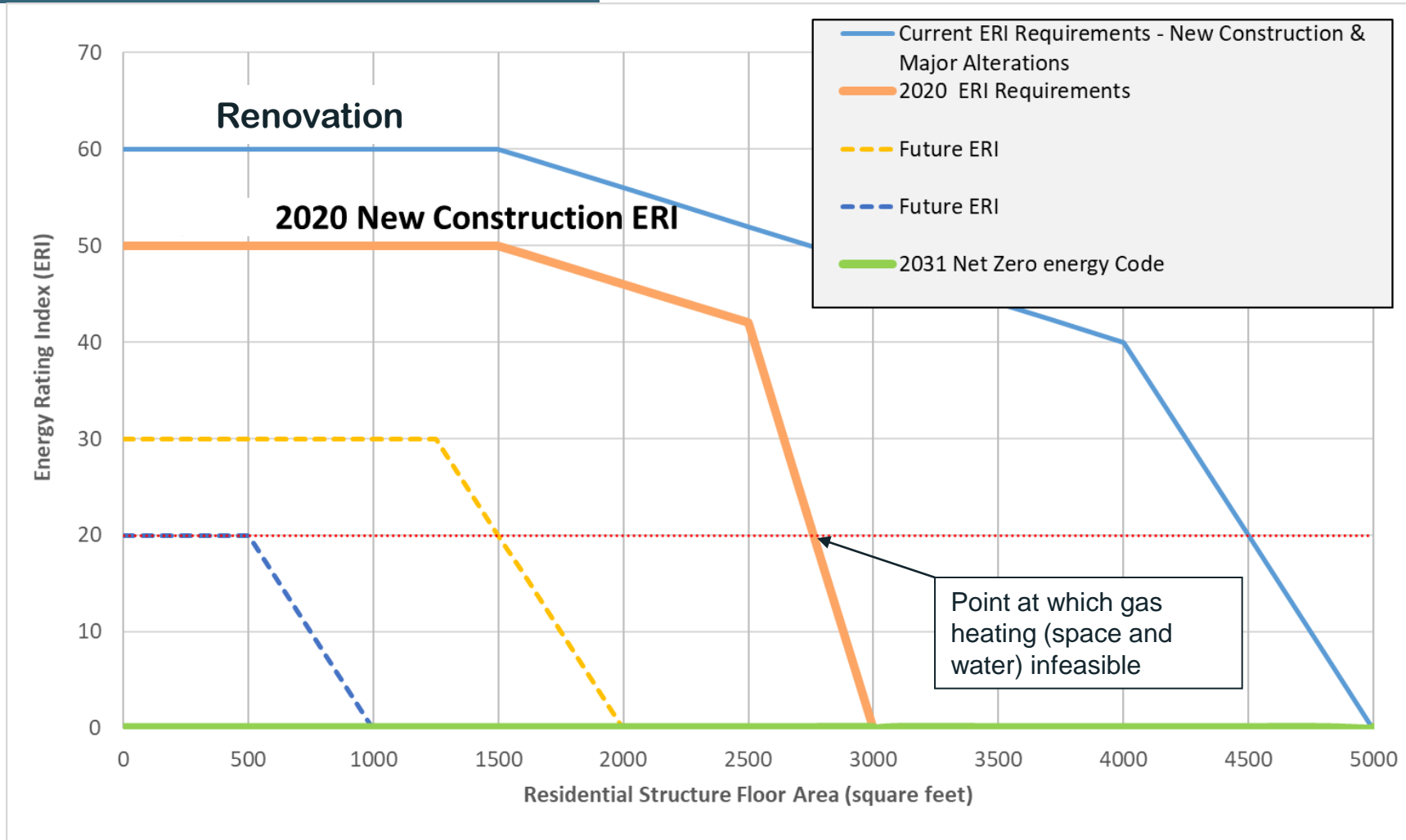


# Building Better: Boulder Energy Code



- Among the most stringent in the country (25-30% better than national code)
- Net-zero by 2030
- Commercial
  - EUI (energy-use per square foot) code requirements
  - Incentivize all-electric buildings
  - Required PV (5% of electrical needs)
- Residential Codes
  - Net-zero >3000 square feet
- EV and EV-ready requirements
- Deconstruction and demolition requirements
- 0.5 MMTCO<sub>2</sub> by 2030; 2.4 MMTCO<sub>2</sub> by 2050

# RESIDENTIAL BUILDING CODES





## COMMERCIAL CODES – MULTI-FAMILY

- ▶ Incentivize all-electric buildings
- ▶ Required PV
- ▶ EV and EV-ready requirements
- ▶ EUI (Low-rise apartment): 32 kbtu/ft<sup>2</sup>



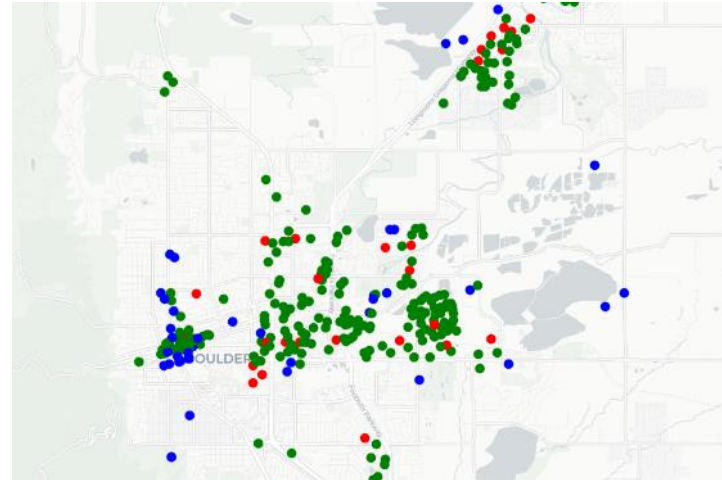
# Local Regulation: Building Performance

## Current

- Annual Rating and Reporting
- Efficiency Every 10 Years
  - Energy Assessment
  - Lighting
  - Tune-up
- 0.4 MMTCO<sub>2</sub> by 2030

## Coming Soon

- Boulder BPO 2.0
  - Aligning with State
  - Driving towards Electrification
  - Targets by building type
  - Enhanced residential

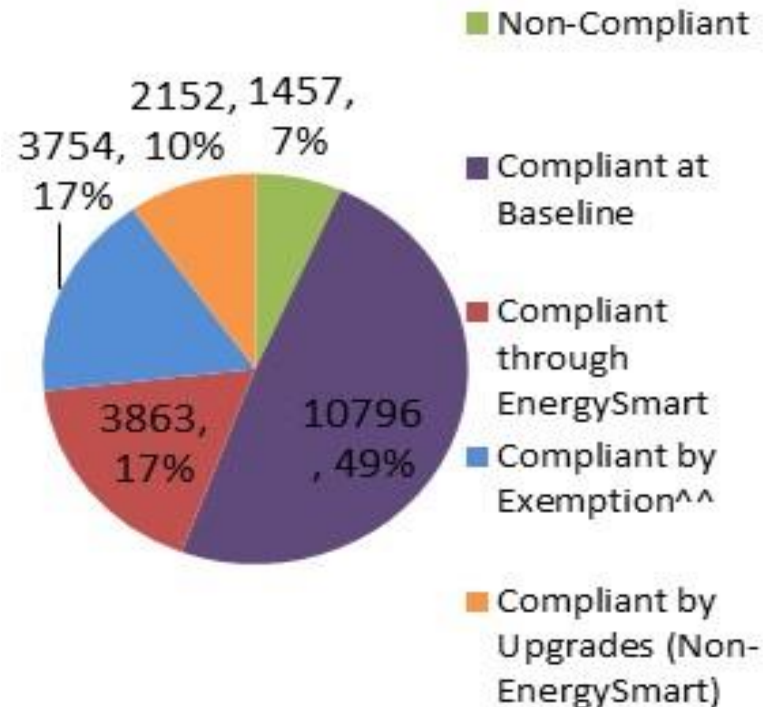


# SmartRegs

More than half of the residential units in Boulder are long-term rentals

SmartRegs was a first of its kind program model for improving energy equity in rental properties

Minimum performance threshold set based on the 2007 IECC



# Beyond Regulation

# Education

**COMFORT<sub>365</sub>**

RENEWABLE COOLING & HEATING

**COMFORT<sub>365</sub>**

RENEWABLE HEATING & COOLING



**energysmart**

*Your Efficiency Solutions*

## Residential Roadmap to Renewable Energy Living

*Upgrading your household energy system  
towards a sustainable energy future*



Jennifer & Keith Harper  
2825 La Grange Cir, Boulder, CO 80305

# Community Programs

- Established what is now a national model for rebate and advising services
  - *Equity-focused programs and services*
- >5000 homes and 1200 businesses upgraded
- >\$8 million in rebates
- >\$28 million in private investment leveraged
- >20,000 tons CO<sub>2</sub> avoided per year



# Key Learnings



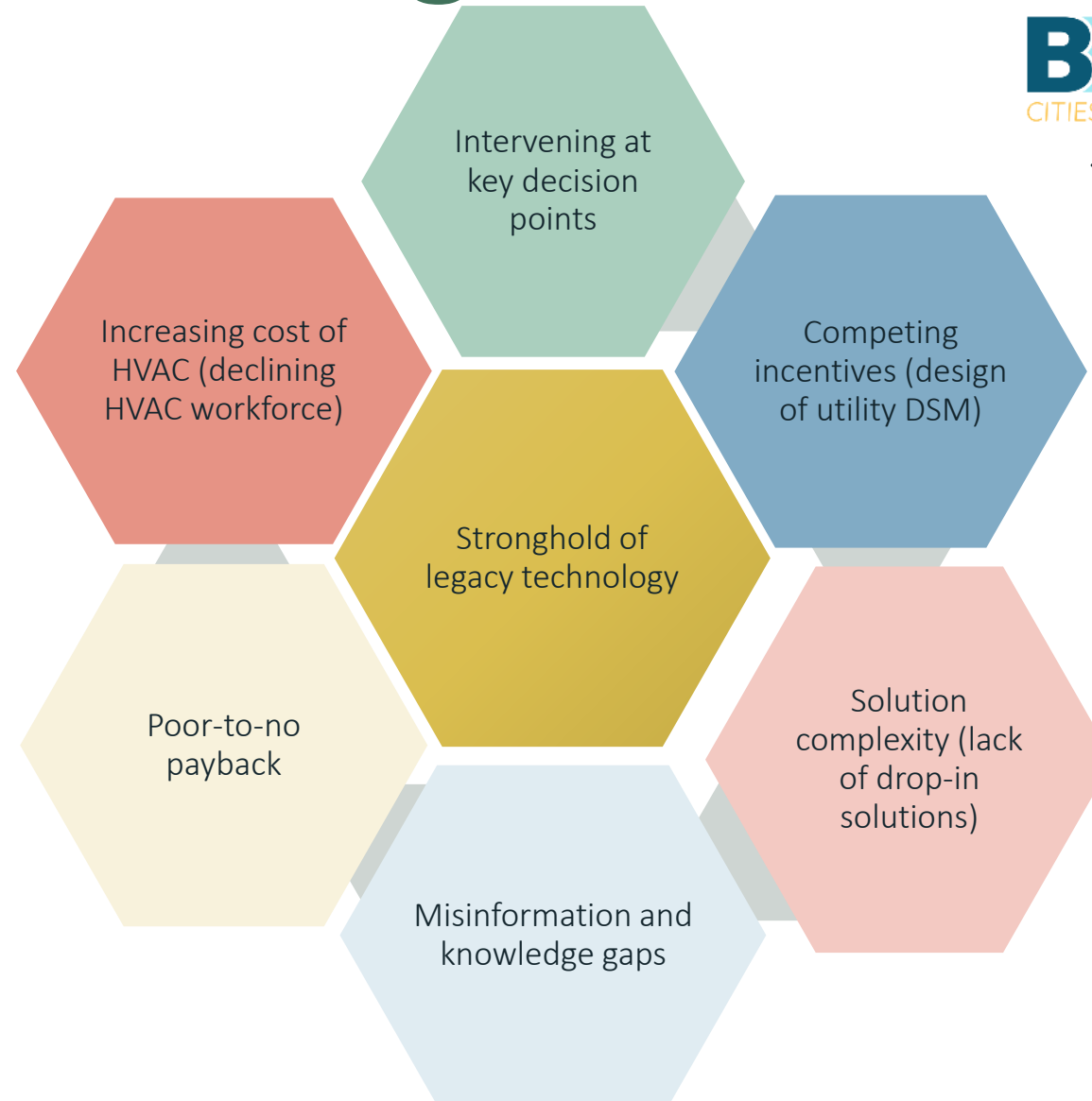
State-wide utility partnerships

Contractor Outreach and Education



Contractor Training

Incentives and Financing Tools



Tariff and Other Innovative Financing

Next Generation Regulation



DI-Focused Programs



Turnkey-Solutions

Workforce



# Modular Construction Factory

- **City** – provide funding to construct the factory and the tools to equip
- **Flatirons Habitat for Humanity** – manage the facility, procure materials, and provide logistical support of organizing volunteers, homeowners, professional staff and integration of TEC students
- **School District** – provide land on the Educational Resource campus for the construction of the factory at no cost for a period of at least 10 years and use the operation as a teaching facility for the TEC Construction class

*Resilient and Affordable*



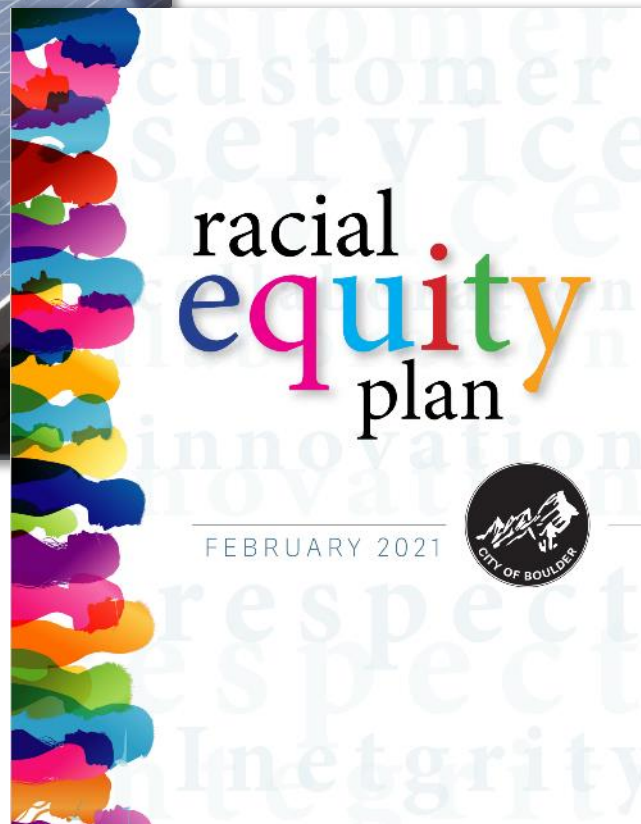
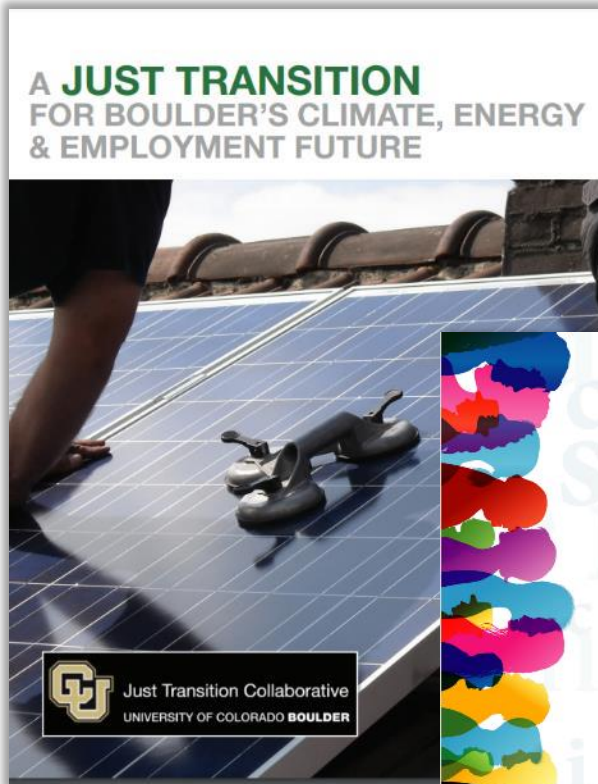


# Boulder Housing Partners





# Centering Equity in Climate Action



## FLAWS Impact



412 units visited



412 LEDs installed



302 water fixtures  
installed



1,160 residents impacted

# Thank You

Carolyn Elam



**City of Boulder  
Climate Initiatives**

O: 303-441-4936

[elamc@bouldercolorado.gov](mailto:elamc@bouldercolorado.gov)

# Explore the Residential Program Solution Center

Resources to help improve your program and reach energy efficiency targets:

- [Handbooks](#) - explain *why* and *how* to implement specific stages of a program.
- [Quick Answers](#) - provide answers and resources for common questions.
- [Proven Practices](#) posts - include lessons learned, examples, and helpful tips from successful programs.
- [Technology Solutions](#) **NEW!** - present resources on advanced technologies, **HVAC & Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.
- [Health + Home Performance Infographic](#) **NEW!** – spark homeowner conversations.



<https://rpssc.energy.gov>

# New Health + Home Performance Infographic



## Do You Have a “Healthy Home?”

A qualified contractor can help you assess and address indoor air quality, improve your comfort, and cut your utility bills.

Answers to a few basic questions can help you get started:

- **How old are your heating and cooling systems?**  
Ensuring your system is updated and well maintained can save money and improve health and comfort.
- **Is your home insulated?**  
Properly installed insulation in your walls and attic, at levels recommended for your home's climate, will cut bills, and improve comfort.
- **Have you ever noticed mold in your home?**  
Visible mold likely means humidity levels need to be better addressed or indicates a potential leak or water damage.
- **Are your windows caulked and doors weather-stripped?**  
These relatively simple fixes reduce air leaks and help maintain indoor temperature levels.
- **Are your appliances ENERGY STAR® rated?**  
ENERGY STAR appliances are energy efficient and help you save money.
- **Do you know if your home's heating and cooling systems include proper levels of ventilation?**  
Effective ventilation is important for both health and safety. Ventilation, along with frequently replaced air filters, can help make sure your home is bringing in fresh air as needed, and keep out pollutants when outdoor air quality is poor due to ozone, fire, or other factors.

**GET started**

**FIND A QUALIFIED CONTRACTOR:**

- Home Performance with ENERGY STAR® at [ENERGYSTAR.gov/HomePerformance](http://ENERGYSTAR.gov/HomePerformance)
- Building Performance Institute at [bpi.org/locator-tool](http://bpi.org/locator-tool)

U.S. DEPARTMENT OF ENERGY | OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY  
BUILDING TECHNOLOGIES OFFICE

DOE/EE-2349

HOME PERFORMANCE WITH ENERGY STAR

DOE’s new Health + Home Performance Infographic reveals the link between efficiency and health – something everyone cares about. Efficiency programs and contractors can use the question-and-answer format to discover a homeowner’s needs.

The infographic is ideal for the “kitchen table” conversations where people decide what to do – and who they want to do it. It also has links for homeowners to find a qualified contractor if they do not already have one.

[Download](#) this infographic from DOE’s Better Buildings Residential Network.

# Thank You!

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[Better Buildings LinkedIn](#)



[Office of Energy Efficiency and Renewable Energy  
Facebook](#)

Please send any follow-up questions  
or future call topic ideas to:  
[bbresidentialnetwork@ee.doe.gov](mailto:bbresidentialnetwork@ee.doe.gov)